

Amendments to the Claims

Please cancel Claims 28, 34, 35, 40, 43, 54, 69, 82-118 and 126. Please amend Claims 1-17, 19-24, 27, 29-31, 36, 41, 42, 44-46, 50, 51, 53, 55-62, 66, 68, 70-78, 80, 81, 119-123, 125 and 127. Please add new Claims 128-181. The Claim Listing below will replace all prior versions of the claims in the application:

Claim Listing

1. (Currently amended) An asymmetric field ion mobility apparatus for identification of ion species, the said apparatus comprising:

a flow path having an input part, an ion filter part and an output part;

an ion filter in said filter part associated with a flow path, said flow path having a longitudinal axis for the flow of ions in said filter, said filter supplying an asymmetric filter field transverse to said longitudinal axis for filtering ions in said flow of ions by species, said filter field being compensated to pass a selected ion species from said flow of ions through said filter toward said output part;

a support structure providing a plurality of supported electrodes associated with said flow path, said supported electrodes including spaced filter electrodes spaced apart by said support structure in said ion filter part; said spaced apart filter electrodes separated by an analytical gap for forming said ion filter in said filter part;
an electrical input for driving said ion filter and generating said asymmetric filter field in said gap;

an ion flow part for longitudinally propelling said flow of ions along said flow path, said ion flow part propelling said ions via a propulsion field, said propelled ions flowing in said filter; ~~and~~

said support structure defining an enclosed flow path in said ion filter part, said support structure defining an enclosed ion filter including said spaced apart filter electrodes, said filter electrodes being separated from each other by said support structure in said filter part; and

said ion filter selecting a species of said propelled ions flowing in said filter, said selected species passing through said filter and having at least one characteristic

correlated with said compensated asymmetric filter field, said correlation facilitating identification of said selected and passed ion species.

2. (Currently amended) Apparatus of claim 1 further comprising:
an ion source and a detection region, ~~the~~ wherein said ion flow part is an ion flow generator for providing a flow of said ions flowing in the said filter from the said ion source, said ions flowing toward said detection region in a longitudinal direction toward the detection region said selected species.
3. (Currently amended) Apparatus of claim 1 wherein ~~the asymmetric field is compensated to prefer a species of the ions to be passed through the filter by the flow part.~~ said filter electrodes are integral with said support structure, wherein said support structure includes a spacer part, said support structure and said spacer part cooperating with said filter electrodes to enclose said ion filter while defining said gap.
4. (Currently amended) Apparatus of claim 2 further comprising a detector in said detection region, said detector generating a detection signal representative of said ion species passed by ~~the said~~ filter.
5. (Currently amended) Apparatus of claim 1 wherein said propulsion field ~~ion flow part~~ further comprises an electric propulsion field for providing said propelling.
6. (Currently amended) Apparatus of claim 5 further comprising a control part, wherein said propulsion field is a longitudinal electric field and wherein a said control part includes ~~an intelligent~~ an electronic controller, including a microprocessor, for controlling said compensated asymmetric field and said longitudinal propulsion field and for correlating said controlling with a detection signal indicative of said selected and passed ion species.
7. (Currently amended) Apparatus of claim 6 wherein ~~the said~~ said control part includes an intelligent electronic controller, including a microprocessor and lookup table, for controlling said compensated asymmetric field and said longitudinal propulsion with

control signals and for correlating said control signals with said detection signal and said lookup table, for identifying said ~~detected~~ selected and passed ion species.

8. (Currently amended) Apparatus of claim 2 wherein ~~the~~ said ion filter includes at least a pair of electrodes facing each other over said gap and the flow path having connection for an electric controller, said controller for applying a compensated asymmetric periodic voltage to said filter electrodes.
9. (Currently amended) Apparatus of claim 1 wherein ~~the~~ said ion filter includes a plurality of electrodes facing each other over the said flow path and having pads for connection to an electric controller, members of ~~the~~ said plurality being used to create said filter field and ~~a~~ said longitudinal propulsion field.
10. (Currently amended) Apparatus of claim 9 1 wherein said ion filter includes a plurality of electrodes facing each other over said flow path and having pads for connection to an electric controller, members of said plurality being used to ~~wherein said members~~ create said filter field and said propulsion field simultaneously.
11. (Currently amended) Apparatus of claim 9 wherein said members create said filter field and said propulsion field simultaneously using selected ~~different~~ members of said plurality.
12. (Currently amended) Apparatus of claim 2 wherein one or more sets of electrodes are used to create said filter field for ion discrimination and ~~the~~ said ion flow part uses one or more of said electrodes to create an electric field at some angle to said filter field for propelling said ions through said ~~filtering~~ filter field.
13. (Currently amended) Apparatus of claim 12 further comprising ~~an~~ a material layer over any of said electrodes, said layer being not fully conductive and preferably insulative or resistive layer over any ones of the said electrodes.
14. (Currently amended) Apparatus of claim 1 ~~further comprising a housing defining a planar, coaxial, concentric, or cylindrical geometry~~ wherein said filter electrodes are

integral with said support structure, said insulating support including a spacer part, said support structure and said spacer part cooperating with said filter electrodes to enclose said flow path and to define said gap in said filter region.

15. (Currently amended) Apparatus of claim 2 wherein said ion flow part provides a longitudinal electric field transport to transport said ions in said filter.
16. (Currently amended) Apparatus of claim 15 wherein compensation is applied to said filter to pass ions forming a species sharing a common set of characteristics, said longitudinal propulsion field propelling ions through said asymmetric electric field according to said characteristics and said filter compensation.
17. (Currently amended) Apparatus of claim 16 wherein said longitudinal electric propulsion field is either constant or varying in time or space, and may be pulsed.
18. (Previously presented) Apparatus of claim 2 wherein said ion flow part further comprises discrete electrodes supported by and insulated from said filter electrodes by an insulating medium.
19. (Currently amended) Apparatus of claim 9 wherein said plurality of supported electrodes includes at least one ring electrode.
20. (Currently amended) Apparatus of claim 9 wherein said plurality of supported electrodes includes at least one pair of planar electrodes.
21. (Currently amended) Apparatus of claim 1 further having an ion source and a detector region, a plurality of electrodes forming said ion flow part and being used to create a propulsion field which flows-propels ions in a ~~longitudinal~~ direction away from said ion source toward said detector region.
22. (Currently amended) Apparatus of claim 21 further defining ~~wherein said plurality of electrodes defines~~ first and second sets of electrodes, said sets facing each other across said flow path, a respective longitudinal electric propulsion field being established

between ~~the~~ said electrodes of each set, each said respective longitudinal propulsion field having a longitudinal flow direction heading along said flow path toward said detector region.

23. (Currently amended) Apparatus of claim 22 wherein said longitudinal propulsion fields are essentially equal.
24. (Currently amended) Apparatus of claim ~~23~~ 22 wherein said first and second sets of electrodes each include a first bias electrode and a second bias electrode for application of a dc bias thereto, ~~the~~ said first of said bias electrodes in each said set being biased relatively more than ~~the~~ said second of said bias electrodes of each said set.
25. (Original) Apparatus of claim 24 wherein said first bias electrodes are negatively biased.
26. (Original) Apparatus of claim 24 further comprising an ion concentrating device, said device urging said ions toward the center of said flow path as they flow downstream in said filter.
27. (Currently amended) Apparatus of claim 26 wherein said concentrating device includes said pairs of biased electrodes, wherein said propelled ions are driven transversely toward ~~the~~ said center of said flow path and selected ion species are passed by said filter as they flow downstream down ~~the~~ said center of said flow path.
28. (Canceled)
29. (Currently amended) Apparatus of claim ~~28~~ 27 further comprising a compensation source for supply of a dc bias to selected ones of said electrodes to compensate said asymmetric field.
30. (Currently amended) Apparatus of claim ~~24~~ 2 wherein said ion filter and said ion flow ~~part~~ generator share common longitudinal space along said flow path.

31. (Currently amended) Apparatus of claim ~~1~~ 2 wherein said ion flow is from an ion source heading downstream along said flow path toward a detector, wherein said filter operates without a gas flow through it in said downstream direction.
32. (Original) Apparatus of claim 1 wherein said filter operates with a reverse gas flow through it, said reverse gas flow traveling in a direction counter to that of said ion flow through said filter.
33. (Previously presented) Apparatus of claim 32 wherein said reverse gas flow includes a supply of clean filtered gas for cleansing of said ion filter.
34. (Canceled)
35. (Canceled)
36. (Currently amended) Apparatus of claim 1 ~~35~~ wherein said ion filter includes at least a pair of electrodes facing each other over said flow path.
37. (Original) Apparatus of claim 36 wherein said ion filter electrodes are covered with an insulation layer.
38. (Previously presented) Apparatus of claim 37 wherein said ion flow part electrodes are formed over said insulation layer.
39. (Original) Apparatus of claim 38 wherein ones of said electrodes are ring electrodes.
40. (Canceled)
41. (Currently amended) Apparatus of claim 2 ~~40~~ further comprising a resistive divider circuit to provide a potential gradient to ~~ones of~~ sets of said electrodes for generation of said propulsion field.
42. (Currently amended) Apparatus of claim 1 wherein said support structure further comprises ~~further comprising~~ insulating substrates, further comprising a plurality of

metal filter electrodes on said insulating substrates, said substrates facing each other ~~and forming along~~ said flow path.

43. (Canceled)
44. (Currently amended) Apparatus of claim 42 1 wherein said filter electrodes are coated with a thin insulator and a resistive layer, further comprising ~~and~~ propulsion electrodes associated with ~~are formed on~~ said resistive layer for generation of said longitudinal electric propulsion field ~~therebetween~~.
45. (Currently amended) Apparatus of claim 44 wherein said ~~propulsion electrodes make contact with said~~ resistive layer is configured to enable a voltage drop that generates said longitudinal electric propulsion field.
46. (Currently amended) Apparatus of claim 9 ~~wherein said flow path defines a gap between said filter electrodes~~, further including a second flow path, said first and second flow paths joined by a passageway, further having a source for a sample-carrying gas, said second flow path for receipt of said sample-carrying gas, ions in said sample-carrying gas being flowed into said second flow path via said passageway.
47. (Previously presented) Apparatus of claim 46 further comprising deflection electrodes for deflection of said ions into said first flow path, said ions flowed into said gap by said ion flow part.
48. (Previously presented) Apparatus of claim 47 wherein said ion flow part propels said ions through said asymmetric filter field.
49. (Original) Apparatus of claim 48 further comprising a pump to supply a low flow rate of air into said gap.
50. (Currently amended) Apparatus of claim 49 further comprising a housing, said housing further defining said enclosed flow path.

51. (Currently amended) Apparatus of claim 50 wherein said housing includes a desiccant part for conditioning ~~the said~~ sample before ion filtering.
52. (Original) Apparatus of claim 1 further including a plurality of high frequency, high voltage filter electrodes connected to an electric controller for application of an asymmetric periodic voltage to create said filter field.
53. (Currently amended) Apparatus of claim 52 wherein a set ~~ones~~ of said electrodes ~~receive~~ receives DC compensation from said controller for said compensation of said filter field.
54. (Canceled)
55. (Currently Amended) Apparatus of claim ~~54~~ 52 wherein said high frequency electrodes are driven by an RF signal and said compensation is provided by varying an aspect of said RF signal and said ~~and the longitudinal field producing electrodes have a potential developed across them.~~
56. (Currently amended) Apparatus of claim ~~54~~ 52 wherein said controller is configured where ~~the said~~ voltages applied to ~~the said~~ plurality of electrodes can be alternated between a voltage applied to generate said filter field and a voltage applied to generate said propulsion field.
57. (Currently amended) Apparatus of claim 2 ~~4~~ further including a plurality of filter electrodes connectable to an electric controller for application of an asymmetric periodic voltage to create said filter field, further including a plurality of electrodes for generation of an ion propelling electric field by said ion flow part, wherein said high frequency electrodes ~~are drivable while or interspersed with driving the longitudinal~~ and said propulsion field producing electrodes are driven by said controller.
58. (Currently amended) Apparatus of claim 52 wherein said flow path is defined by insulating substrates and said high frequency electrodes are disposed on ~~the said~~ outside walls of said insulating substrates.

59. (Currently amended) Apparatus of claim ~~54~~ 52 wherein said flow path is defined by insulating substrates and wherein a resistive material is deposited on the inside walls of said insulating substrates, and electrodes are formed associated therewith.
60. (Currently amended) Apparatus of claim 52 wherein said filter field is ~~generated by application of an asymmetric periodic voltage to ones of said electrodes, said filter field being~~ compensated by varying the duty cycle of said asymmetric periodic voltage.
61. (Currently amended) Apparatus of claim ~~54~~ 52 wherein an electrical field presence is generated by driving several of said electrodes, said field presence having both transverse and longitudinal components to both filter and propel ~~the said~~ ions, by application of a traveling wave ~~voltage~~.
62. (Currently amended) Apparatus of claim ~~54~~ 52 wherein an electrical field presence is generated by driving several of said electrodes, said field presence having both transverse and longitudinal components to both filter and propel ~~the said~~ ions, wherein an RF signal is applied to ~~the said~~ electrodes to generate a transverse RF filter field, which is compensated, and said ion flow part includes a selection of ~~said electrodes biased to which are at~~ different voltage levels to generate a gradient along ~~the said~~ flow path.
63. (Original) Apparatus of claim 62 including a controller for scanning said electrodes.
64. (Original) Apparatus of claim 1 further comprising a gas flow pump for flow of gas away from said filter in a counter gas flow.
65. (Original) Apparatus of claim 1 further comprising a molecular sieve located proximate to said filter to absorb neutral molecules.
66. (Currently amended) Apparatus of claim 1 further including an ion detector proximate to ~~the said~~ ion filter.
67. (Previously presented) Apparatus of claim 1 further including an ionization source for ionization of a sample to generate ions to be flowed by said ion flow part.

68. (Currently amended) Apparatus of claim 67 wherein ~~the~~ said ionization source is selected from the group including a radiation source, an ultraviolet lamp, a corona discharge device, a plasma source or an electrospray nozzle.
69. (Canceled)
70. (Currently amended) ~~Apparatus of claim 69 in which the ion filter is connected to~~ An asymmetric field ion mobility spectrometer (FAIMS) apparatus comprising:
- a flow path for the flow of ions from an ionization region toward a detector region;
- an ion filter disposed in said flow path downstream from said ionization region,
- said ion filter disposed in said flow path and supplying an asymmetric field transverse to said flow path;
- an ion flow device for creating a longitudinal transport field for propelling ions in said filter along said flow path;
- said asymmetric field being transverse to said ion flow in said flow path;
- said ion filter passing ions toward said detector region as influenced by said transverse asymmetric field and as propelled by said transport field;
- an electric ~~controller~~ control source for applying an asymmetric periodic voltage to the said ion filter, and wherein said ion filter includes a pair of spaced electrodes for creating a compensated asymmetric electric field and the said ion flow device includes a plurality of spaced electrodes for creating the longitudinal field said longitudinal transport field; wherein said spaced electrodes are not concentric cylinders; and wherein said electrodes of said pair of spaced electrodes are separated by an analytical gap, said flow of ions flowing in said gap according to said longitudinal transport field, and said flow of ions in said gap being filtered according to aspects of ion mobility in said compensated asymmetric electric field.
71. (Currently amended) Apparatus of claim 70 in which ~~the~~ said ion filter includes a first plurality of discrete electrodes electrically connected to an electric controller which

applies an asymmetric periodic voltage to ~~the~~ said first plurality of discrete electrodes and in which ~~the~~ said ion flow device includes a second plurality of discrete electrodes dispersed among ~~the~~ said first plurality of discrete electrodes connected to a voltage source which generates a potential gradient along ~~the~~ said second plurality of discrete electrodes creating a preferential ion flow direction in said flow path.

72. (Currently amended) Apparatus of claim 70 ~~74~~ in which the gap between ~~the~~ said filter electrodes is enclosed by a housing, said ion filter includes electrodes on a surface of ~~the~~ said housing and ~~the~~ said ion flow device includes electrodes ~~proximate to the~~ in association with said ion filter.
73. (Currently amended) Apparatus of claim 72 ~~in which the~~ wherein said ion detector includes electrodes on an inside surface of ~~the~~ said housing proximate ~~the~~ said ion filter and ~~the~~ said ion flow device.
74. (Currently amended) Apparatus of claim 70 ~~72~~ in which ~~the~~ said gap is enclosed by a housing, ~~the~~ said ion filter includes electrodes on an outside surface of ~~the~~ said housing and ~~the~~ said ion flow device includes resistive layers on an inside surface of ~~the~~ said housing and a voltage is applied along each layer to create ~~a longitudinal~~ an electric field.
75. (Currently amended) Apparatus of claim 70 ~~69~~ wherein ~~the~~ said ion filter and ~~the~~ said ion flow device are combined and include a series of discrete conductive elements each excited by a voltage source at a different phase.
76. (Currently amended) Apparatus of claim 70 ~~69~~ wherein ~~the~~ said ion filter and ~~the~~ said ion flow device include a series of electrodes in said flow path each excited by a voltage source, electrodes associated with said flow device having a multiphase signal applied thereto for generation of said longitudinal transport field.
77. (Currently amended) Apparatus of claim 70 ~~76~~ further including a housing with a support structure that supports said electrodes and defines the spacing between said electrodes while enclosing said flow path, wherein said housing defines a pair of spaced substrates

~~for support of said filter electrodes, said substrates disposing said ion filter within said flow path, the filter including a pair of spaced electrodes, one electrode associated with each substrate.~~

78. (Currently amended) Apparatus of claim 77 further comprising a controller for selectively applying a bias voltage and an asymmetric periodic voltage across the said filter electrodes to control the path of ions through the said filter under influence of said ion flow device, and an output region for delivery of ions passed by said filter for detection.
79. (Original) Apparatus of claim 78 further comprising a detector in said output region, said detector including a top electrode at a bias voltage and a bottom electrode at a selected bias voltage, said detector electrodes formed on said substrates.
80. (Currently amended) Apparatus of claim 70 69 further comprising a housing for defining and enclosing said flow path between a sample inlet and an outlet.
81. (Currently amended) Apparatus of claim 80 wherein said housing defines insulating substrates for the formation of electrodes facing each other over said flow path.
82. (Canceled)
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116. (Canceled)
117. (Canceled)
118. (Canceled)
119. (Currently amended) An asymmetric field ion mobility spectrometer comprising:
an ionization source ~~for ionizing a sample media and creating ions;~~
an analytical gap;
an enclosed flow path defined by a structure including a plurality of separate electrodes, selected ones of said electrodes separated from each other by said structure and transversely between them defining said analytical gap in said enclosed flow path, said ionization source including means for delivering ions of an ionized sample to said analytical gap;
an ion filter disposed in ~~the~~ said analytical gap downstream from ~~the~~ said ionization source for creating an asymmetric electric field to filter ~~the~~ said ions in said analytical gap;
an ion flow generator for creating an electric field transverse to ~~the~~ said asymmetric electric field for propelling ions through ~~the~~ said asymmetric electric field,

said plurality of electrodes including electrodes driven by said flow generator according to a phased ion propulsion function; and

an ion output part for receiving detector for sensing ions not filtered by the said ion filter.

120. (Currently amended) The spectrometer of claim 119 where ~~the~~ said asymmetric electric field is compensated to pass selected ions through ~~the~~ said ion filter, ~~the~~ said ion detector sensing ~~the~~ said propelled ions that pass through ~~the~~ said ion filter and wherein said structure has insulating surfaces for insulating at least some of said electrodes.
121. (Currently amended) The spectrometer of claim 119 further comprising a plurality of electrodes that perform said filtering and said propelling, wherein ones of said electrodes are formed along surfaces of said structure, and wherein said propulsion function is trigonometric.
122. (Currently amended) The spectrometer of claim 119 wherein ~~the~~ said ion filter includes a pair of spaced filter electrodes for creating ~~the~~ said asymmetric electric field and ~~the~~ said ion flow generator includes a plurality of spaced discrete electrodes insulated from ~~the~~ said pair of spaced filter electrodes for creating ~~the~~ said ion flow generator electric field, wherein said structure has insulating surfaces for insulating at least some of said electrodes.
123. (Currently amended) The spectrometer of claim 119 wherein ~~the~~ said analytical gap is enclosed by a housing, ~~the~~ wherein said ion filter includes electrodes on an inside surface of ~~the~~ said housing, and ~~the~~ said ion flow generator includes electrodes proximate but insulated with respect to ~~the~~ said filter electrodes.
124. (Previously presented) The apparatus of claim 1 further comprising a coupling part for coupling said flow path to a chromatographic sample preparation device for delivery of a prepared sample to said flow path, said sample being ionized for filtering in said ion filter.

125. (Currently amended) The apparatus of claim 69 70 further comprising a coupling part for coupling said flow path to a chromatographic sample preparation device for delivery of a prepared sample to said flow path, said sample being ionized for filtering in said ion filter.
126. (Canceled)
127. (Currently amended) The spectrometer of claim 119 further comprising a coupling part for coupling said flow path to a chromatographic sample preparation device for delivery of a prepared sample to said flow path, said sample being ionized for filtering in said ion filter.
128. (New) The apparatus of claim 1 further defining a spectrometer capable of direct sampling of the ambient atmosphere, wherein said spectrometer is suitable for practical gas analysis applications which involve direct sampling of the ambient atmosphere.
129. (New) The apparatus of claim 128 wherein said filter electrodes are non-concentric.
130. (New) Apparatus of claim 2 wherein said spaced filter electrodes are spaced apart by an insulating support in said ion filter part, wherein said ion flow propulsion part further comprises electrodes supported by said insulated support.
131. (New) Apparatus of claim 2 wherein said spaced filter electrodes are spaced apart by an insulating support in said ion filter part, wherein said ion flow propulsion part further comprises electrodes insulated from said filter electrodes by an insulating medium.
132. (New) The apparatus of claim 1 wherein said filter electrodes are non-concentric.
133. (New) The apparatus of claim 1 wherein said filter electrodes are non-cylindrical.
134. (New) The apparatus claim 1 wherein said filter electrodes are parallel.
135. (New) The apparatus of claim 1 wherein said filter electrodes are formed on said flow path.

136. (New) The apparatus of claim 135 wherein said flow path is a rigid structure.
137. (New) The apparatus of claim 136 wherein said filter electrodes are formed as plates on said rigid structure.
138. (New) Apparatus of claim 1 wherein said flow path and said filter field affects the trajectory of ions in said ion filter, wherein said ion filter passes a species of said propelled ions, said species of ions being associated with having a set of correlated characteristics information and trajectory information, wherein identification of said species is facilitated by combination of said information.
139. (New) Apparatus of claim 138 further comprising first and second substrates, said flow path defined by said substrates, wherein an RF filter electrode is associated with said first substrate and a plurality of multi-function electrodes is associated with said second substrate and facing said filter electrode over said flow path.
140. (New) Apparatus of claim 139 wherein said plurality of electrodes forms a segmented detector electrode and ions are filtered and detected by trajectory, being controlled by said asymmetric field and landing on an appropriate one of said detector electrode segments.
141. (New) Apparatus of claim 140 wherein said ions are propelled by said ion flow part, wherein said detector electrodes are monitored such that a particular species can be identified based on its trajectory for a given detection at said monitored detector electrodes and based on said fields in said flow path.
142. (New) A field asymmetric ion mobility system, comprising:
an enclosure extending along an ion flow axis and defining a flow path extending between an inlet part and an outlet part, said flow path including a FAIMS filter region;
said inlet part receiving a sample in said flow path, said sample being ionized and flowing in said flow path toward said filter region;

said filter region including an ion filter associated with said flow path, said flow path supporting a flow of ions including said ionized sample in said ion filter, said flow of ions including target ions associated with said ionized sample;

delivery means for delivering said flow of ions into said ion filter;

a plurality of electrodes associated with said flow path, said plurality of electrodes including filter electrodes associated with said ion filter, said filter electrodes separated by a gap along said flow path, said filter electrodes for generation of an asymmetric RF filter field in said gap transverse to said flow path, and said plurality of electrodes including propulsion electrodes for generating a propulsion field for propelling said ions in said ion filter;

said electrodes being integrated into said enclosure, said enclosure acting to separate support and insulate said filter electrodes, to define said gap, and to enclose the sides of said flow path in said filter region; and

further including an electrical part for supplying an asymmetric periodic voltage to said ion filter for generating said filter field between said filter electrodes, said filter field being compensated for controlling the paths of ions in said flow of ions in said filter, wherein said target ions are filtered from said flow of ions in said filter according to said compensated filter field, wherein said target ions are propelled as a species by said propulsion electrodes through said filter toward said outlet.

143. (New) The system of claim 142 wherein said filter electrodes are non-concentric.
144. (New) The system of claim 143 wherein said filter electrodes are parallel plates.
145. (New) The system of claim 142 wherein said enclosure includes a spacer part, said spacer part separating said filter electrodes and defining said gap.
146. (New) The system of claim 145 wherein said spacer part forms sides of said flow path.
147. (New) The system of claim 142 wherein said enclosure insulates said filter field from the exterior environment, wherein said filter field is formed in said flow path between said filter electrodes, wherein said filter electrodes are shaped and oriented having their

back sides facing away from each other, wherein said back sides face toward said exterior and away from said flow path.

148. (New) The system of claim 142 wherein said flow path further comprises an ion source and a detection region, said propulsion electrodes providing a flow of said ions in said ion filter from said ion source toward said detection region.
149. (New) The system of claim 148 wherein said detector region further comprises a detector, said detector generating a detection signal representative of said ion species passed by said filter.
150. (New) The system of claim 149 wherein said propulsion electrodes supply an electric propulsion field for said propelling said ions.
151. (New) The system of claim 150 further comprising a control part, wherein said propulsion field is an electric field and wherein said control part includes an electronic controller, including a microprocessor, for controlling said compensated asymmetric field and said propulsion field and for correlating said controlling with a detection signal indicative of said detected ion species.
152. (New) The system of claim 159 further comprising a control part, wherein said control part includes an intelligent electronic controller, including a microprocessor and lookup table, for controlling said compensated asymmetric field and said propulsion with control signals and for correlating said control signals with said detection signal and said lookup table, for identifying said detected ion species.
153. (New) The system of claim 152 wherein said plurality of electrodes simultaneously create said propulsion field and said filter field.
154. (New) The system of claim 153 further comprising an insulative layer over any of said electrodes.
155. (New) The system of claim 142 further comprising a resistive layer over any of said electrodes for generating said propulsion field.

156. (New) The system of claim 142 further comprising first and second sets of electrodes each set including a first bias electrode and a second bias electrode for generation of said propulsion field.
157. (New) The system of claim 145 wherein said spacer part further comprises an ion concentrating device, said device urging said ions in said ion flow toward the center of said flow path as they flow downstream in said filter.
158. (New) The system of claim 142 further comprising a compensation source for supply of dc bias to selected ones of said electrodes to compensate said asymmetric field.
159. (New) The system of claim 142 wherein said plurality of electrodes is multi-functional.
160. (New) The system of claim 145 wherein said propulsion electrodes include spaced finite electrodes along said flow path.
161. (New) The system of claim 142 wherein said enclosure further comprises substrates and a plurality of metal filter electrodes on said substrates, said substrates facing each other and forming walls of said flow path.
162. (New) The system of claim 142 further including a second flow path, said first and second flow paths joined by a passageway, further having a source for a sample-carrying gas, said second flow path for receipt of said sample-carrying gas, ions in said sample-carrying gas being flowed into said second flow path via said passageway.
163. (New) The system of claim 162 further comprising deflection electrodes for deflection of said ions into said first flow path, said ions flowed into said gap by said propulsion field.
164. (New) The system Apparatus of claim 142 further comprising a resistive layer associated with said flow path and wherein said resistive layer is configured to enable a voltage drop that generates said propulsion field.

165. (New) The spectrometer of claim 119 further comprising a resistive layer associated with said flow path and wherein said resistive layer is configured to enable a voltage drop that generates said propulsion field.
166. (New) Apparatus of claim 70 further comprising a resistive layer associated with said flow path and wherein said resistive layer is configured to enable a voltage drop that generates said propulsion field.
167. (New) Apparatus of claim 1 wherein said propulsion field is generated by non-segmented propulsion electrodes associated with said flow path.
168. (New) Apparatus of claim 70 wherein said propulsion field is generated by non-segmented propulsion electrodes associated with said flow path.
169. (New) The spectrometer of claim 119 wherein said propulsion field is generated by non-segmented propulsion electrodes associated with said flow path.
170. (New) System of claim 142 wherein said propulsion field is generated by non-segmented propulsion electrodes associated with said flow path.
171. (New) An asymmetric field ion mobility spectrometer apparatus comprising:
- a flow path for the flow of ions from an ionization region toward a detector region;
 - an ion filter disposed in the flow path downstream from the ionization region, the ion filter disposed in the flow path and supplying an asymmetric field transverse to the flow path;
 - an ion flow device for creating a longitudinal transport field for propelling ions in the filter along the flow path;
 - the asymmetric field being transverse to the ion flow in the flow path;
 - the ion filter passing ions toward the detector region as influenced by the transverse asymmetric field and as propelled by the transport field;
 - an electric control source for applying an asymmetric periodic voltage to said ion filter, wherein said ion filter includes a pair of spaced electrodes for creating a

compensated asymmetric electric field and said ion flow device includes facing resistive layers for generating said ion transport field; and

wherein said electrodes of said pair of spaced electrodes are separated by an analytical gap, said flow of ions flowing in said gap according to said transport field, and said flow of ions in said gap being filtered according to aspects of ion mobility in said compensated asymmetric electric field.

172. (New) The Apparatus of claim 171 wherein each said resistive layer includes an upstream electrode and a downstream electrode and a voltage is dropped along said layer between said upstream electrode and said downstream electrode, wherein said ions are transported along said flow path between said resistive layers.

173. (New) An asymmetric field ion mobility spectrometer apparatus comprising:
- a flow path for the flow of ions from an ionization region toward a detector region;
 - an ion filter disposed in said flow path downstream from said ionization region, said ion filter disposed in said flow path and supplying an asymmetric field transverse to said flow path;
 - an ion flow device for creating a longitudinal transport field for propelling ions in said filter along said flow path;
 - said asymmetric field being transverse to said ion flow in said flow path;
 - said ion filter passing ions toward said detector region as influenced by said transverse asymmetric field and as propelled by said transport field;
 - an electric control source for applying an asymmetric periodic voltage to said ion filter, wherein said ion filter includes a pair of spaced electrodes for creating a compensated asymmetric electric field and said ion flow device includes a plurality of spaced electrodes for creating said transport field; wherein said propulsion electrodes are not segmented; and
 - wherein said spaced electrodes are separated by an analytical gap, said flow of ions flowing in said gap according to said transport field, and said flow of ions in said

gap being filtered according to aspects of ion mobility in said compensated asymmetric electric field.

174. (New) Method for filtering chemical species by field asymmetric ion mobility spectrometry, comprising the steps of:

providing an ion filter associated with a flow path, said flow path having a longitudinal axis for the flow of ions, said filter supplying an asymmetric filter field transverse to said longitudinal axis for filtering ions in said flow of ions by species, said filter field being compensated to pass a selected ion species from said flow of ions through said filter, said flow path having an input part, an output part, and an ion filter part for containing said ion filter;

providing a support structure with a plurality of supported electrodes associated with said flow path, said supported electrodes including spaced filter electrodes spaced apart by said support structure in said ion filter part; said spaced apart filter electrodes separated by an analytical gap for forming said ion filter in said filter part;

providing an electrical input for driving said ion filter and generating said asymmetric filter field in said gap;

providing an ion flow part for propelling said flow of ions along said flow path from said input part along said ion filter part and toward said output part, said ion flow part propelling said ions via a propulsion field, said propelled ions flowing in said filter; defining an enclosed flow path in said ion filter part, said support structure defining an enclosed ion filter including said spaced apart filter electrodes, said filter electrodes being separated from each other by said support structure in said filter; and

selecting a species of said propelled ions flowing in said filter, said selected species being passed by said filter and having at least one characteristic correlated with said compensated asymmetric filter field, said correlation facilitating identification of said selected and passed ion species.

175. (New) Method of claim 174 further including the step of propelling ions through said asymmetric electric field according to a phased ion propulsion function.

176. (New) Method of claim 174 further including the step of integrating said filter electrodes into said support structure.
177. (New) Method of claim 174 further including the step of forming at least one resistive propulsion layer along said flow path wherein said ions are transported along said flow path under influence of said at least one resistive layer.
178. (New) Method of claim 174 further including the step of forming resistive propulsion layers along said flow path, wherein each said resistive layer includes an upstream electrode and a downstream electrode and a voltage is dropped along said layer between said upstream electrode and said downstream electrode, wherein said ions are transported along said flow path between said resistive layers.
179. (New) Method of claim 174 further including the step of defining said filter electrodes as not concentric cylindrical electrodes.
180. (New) Method of claim 174 further including the step of defining said propulsion electrodes as non-segmented electrodes.
181. (New) An asymmetric field ion mobility spectrometer comprising:
 - a source of ionized sample;
 - an analytical gap;
 - an enclosed flow path defined by a structure including a plurality of electrodes; selected ones of said electrodes separated from each other by said structure and transversely between them defining said analytical gap in said enclosed flow path, said ionization source enabling delivery of ions from an ionized sample to said analytical gap;
 - an ion filter disposed in said analytical gap downstream from said ionization source for creating a high-low varying asymmetric RF field to filter said ions in said analytical gap;

said ion filter including a filter electrode and an opposed filter electrode of several segments, said ion filter further defining a segmented ion detector having segmented detector electrodes; and

an ion propulsion generator for creating an ion propulsion field transverse to said RF filter field and along said flow path for propelling ions in said analytical gap, each ion obtaining a trajectory according to its species; and

said ion detector detecting said ion species as said ions contact said segments according to said trajectory.